

**299-W18-80 (A7563)**  
**Log Data Report**

**Borehole Information:**

<b>Borehole:</b> 299-W18-80 (A7563)		<b>Site:</b> 216-Z-1A Crib			
<b>Coordinates (WA St Plane)</b>		<b>GWL<sup>1</sup> (ft):</b> N/A	<b>GW Date:</b> 07/17/06		
<b>North</b> 135,425.927 m	<b>East</b> 566,548.767 m	<b>Drill Date</b> 3/31/67	<b>Ground Level Elevation</b> 205.265m	<b>Total Depth (ft)</b> 20	<b>Type</b> Cable

**Casing Information:**

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Steel	-0.3 ft	6 5/8	6	5/16	0	20

**Borehole Notes:**

The logging engineer measured the casing stick-up and diameter using a caliper and steel tape. Logging data acquisition is referenced to the TOC (below grade).

The driller's log notes that contamination was encountered at 8 ft (20,000 dpm), 11 ft (2,000 dpm), 13 ft (2,500 dpm) and 21.5 ft (20,000 dpm).

**Logging Equipment Information:**

<b>Logging System:</b>	Gamma 1E	<b>Type:</b>	SGLS (70%) SN: 34TP40587A
<b>Effective Calibration Date:</b>	05/02/06	<b>Calibration Reference:</b>	DOE/EM-GJ1200-2006
		<b>Logging Procedure:</b>	GJO-HGLP 1.6.5, Rev. 1

<b>Logging System:</b>	Gamma 4H	<b>Type:</b>	NMLS SN: H310700352
<b>Effective Calibration Date:</b>	03/06/06	<b>Calibration Reference:</b>	DOE/EM-GJ1154-2006
		<b>Logging Procedure:</b>	GJO-HGLP 1.6.5, Rev. 1

**Spectral Gamma Logging System (SGLS) Log Run Information:**

Log Run	1	2	3	4	
Date	07/19/06	07/20/06	07/20/06	07/20/06	
Logging Engineer	McClellan	McClellan	McClellan	McClellan	
Start Depth (ft)	19.0	11.0	19.18	6.0	
Finish Depth (ft)	10.0	0.0	NA	NA	

<b>Log Run</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
Count Time (sec)	200 s	200 s	1000 s	1000	
Live/Real	R	R	R	R	
Shield (Y/N)	NA	NA	NA	NA	
MSA Interval (ft)	1.0 ft	1.0 ft	NA	NA	
ft/min	NA	NA	NA	NA	
Pre-Verification	AE178CAB	AE180CAB	AE180CAB	AE180CAB	
Start File	AE179000	AE180000	AE180012	AE180013	
Finish File	AE179009	AE180011	NA	NA	
Post-Verification	AE179CAA	AE180CAA	AE180CAA	AE180CAA	
Depth Return Error (in.)	0	0	NA	0	
Comments	No fine gain adjustment made.	No fine gain adjustments made.	No fine gain adjustments	No fine gain adjustments	

**Neutron Moisture Logging System (NMLS) Log Run Information:**

<b>Log Run</b>	<b>4</b>	<b>5</b>			
Date	07/21/06	07/21/06			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	0	3.0'			
Finish Depth (ft)	19.0'	11.0'			
Count Time (sec)	15 s	15 s			
Live/Real	R	R			
Shield (Y/N)	NA	NA			
Sample Interval (ft)	0.25 ft	0.25 ft			
ft/min	NA	NA			
Pre-Verification	DH182CAB	DH182CAB			
Start File	DH182000	DH182077			
Finish File	DH182076	DH182109			
Post-Verification	DH182CAA	DH182CAA			
Depth Return Error (in.)	NA	Low 1"			
Comments	None	Repeat section.			

**Logging Operation Notes:**

Logging was conducted with a centralizer. Measurements are referenced to top of casing.

**Analysis Notes:**

<b>Analyst:</b>	McCain	<b>Date:</b>	08/14/06	<b>Reference:</b>	GJO-HGLP 1.6.3, Rev. 0
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Pre-run and post-run verifications for the logging systems were performed before and after each day's data acquisition. SGLS acceptance criteria were met. The fwhm for all three peaks in AE179CAA and the 1461 keV peak in AE180CAA were slightly above the upper control limit. All spectra were examined and found to be acceptable.

A casing correction for 5/16-in.-thick casing was applied throughout the borehole.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with an EXCEL worksheet template identified as G1EMay06.xls using an efficiency function and corrections for casing and dead time as determined from annual calibrations.

### **Results and Interpretations:**

No significant indication of manmade contamination was detected in this borehole from spectra collected using routine count times. Spectra were evaluated for gamma activity at 312 keV ( $^{233}\text{Pa}/^{237}\text{Np}$ ), 375 keV ( $^{239}\text{Pu}$ ), 662 keV ( $^{137}\text{Cs}$  or  $^{241}\text{Am}$ ), and 722.01 keV ( $^{241}\text{Am}$ ). However, spectra were collected at 6.0 and 19.18 ft, using 1000 seconds count time. The spectra collected at 19.18 ft represents a measurement at the bottom of the borehole, where the drillers log indicated contamination at 20,000 dpm. Examination of spectra AE180012 shows evidence of  $^{241}\text{Am}$  at about 11,400 pCi/g, with  $^{237}\text{Np}$  at about 0.88 pCi/g; these levels are below the minimum detectable activity for the 200-second measurements. From this it can be inferred that some degree of contamination is present near the bottom of the borehole.

The neutron moisture logging plots indicate volumetric moisture in percent.

The repeat logs all show good repeatability.

### **List of Log Plots:**

Man-Made Radionuclide Plot (0-160 ft)  
Man-Made Radionuclide Plot (0-20 ft)  
Natural Gamma Logs (0-160 ft)  
Combination Plot (0-120 ft)  
Combination Plot (0-25 ft)  
Total Gamma, Dead Time, & Moisture (0-160 ft)  
Repeat Section for Natural Gamma Logs (0-20 ft)  
Repeat Sections for Moisture

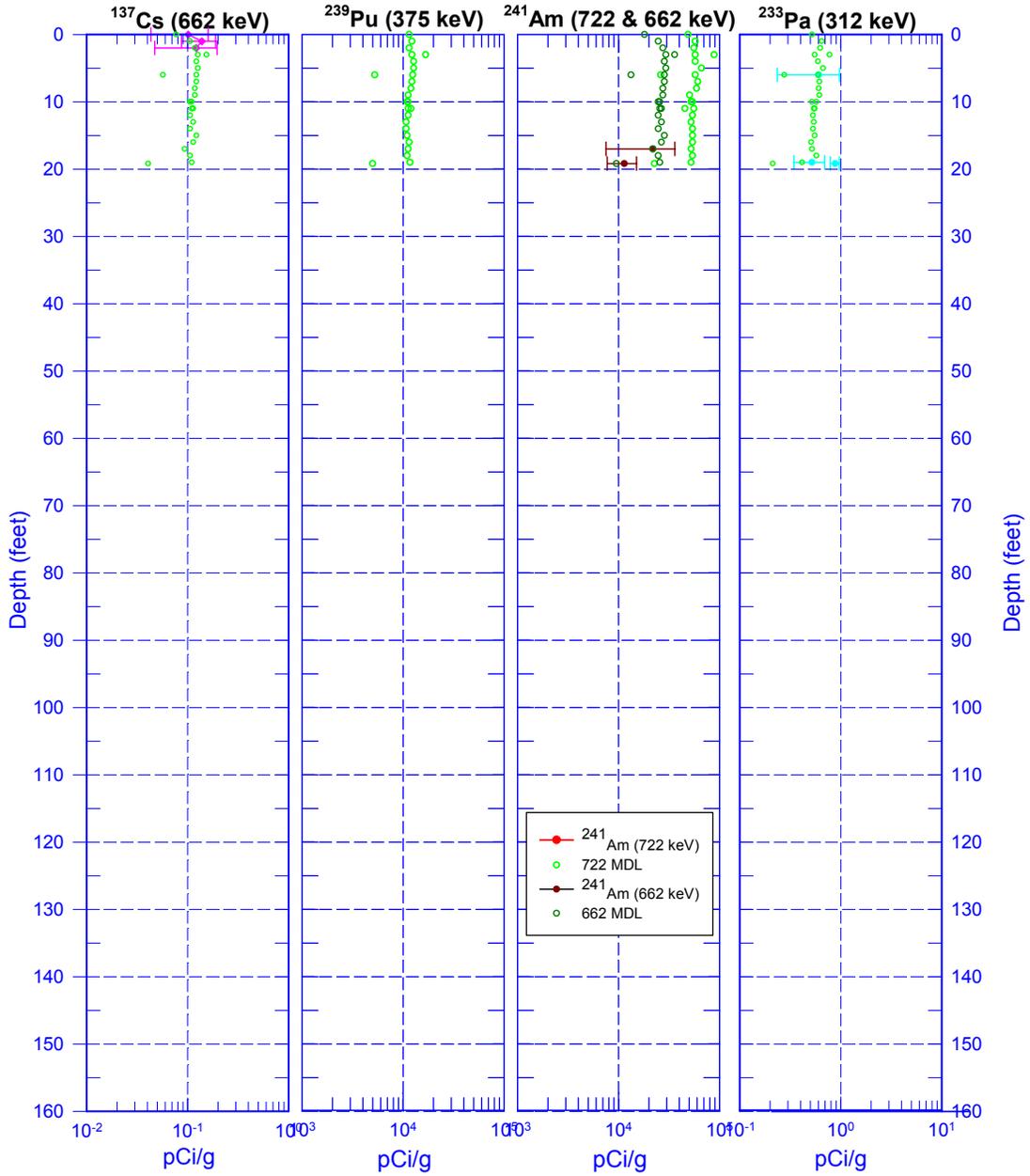
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<sup>1</sup> GWL – groundwater level

<sup>2</sup> N/A – not applicable

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## Man-made Radionuclide Plot

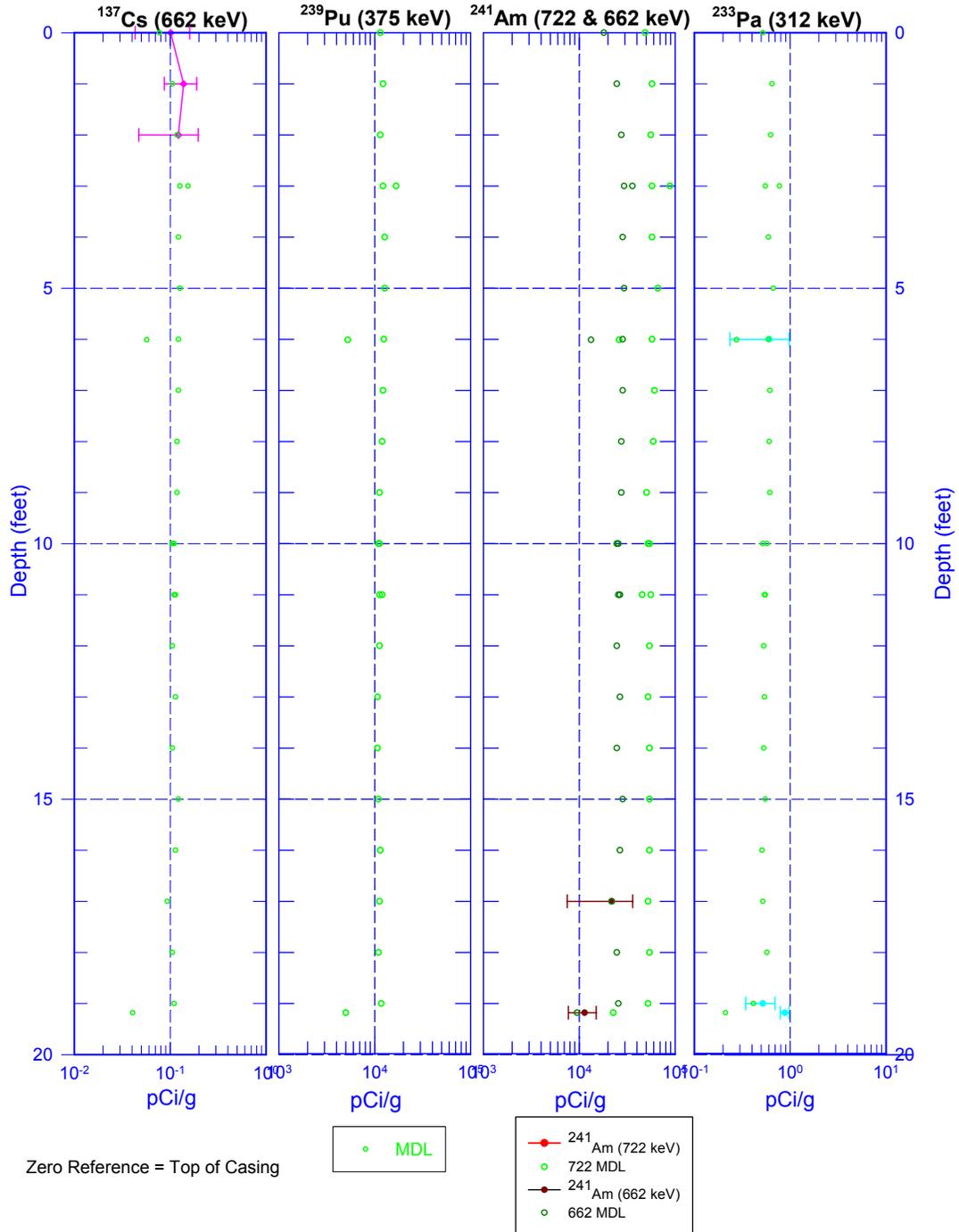


Zero Reference = Top of Casing

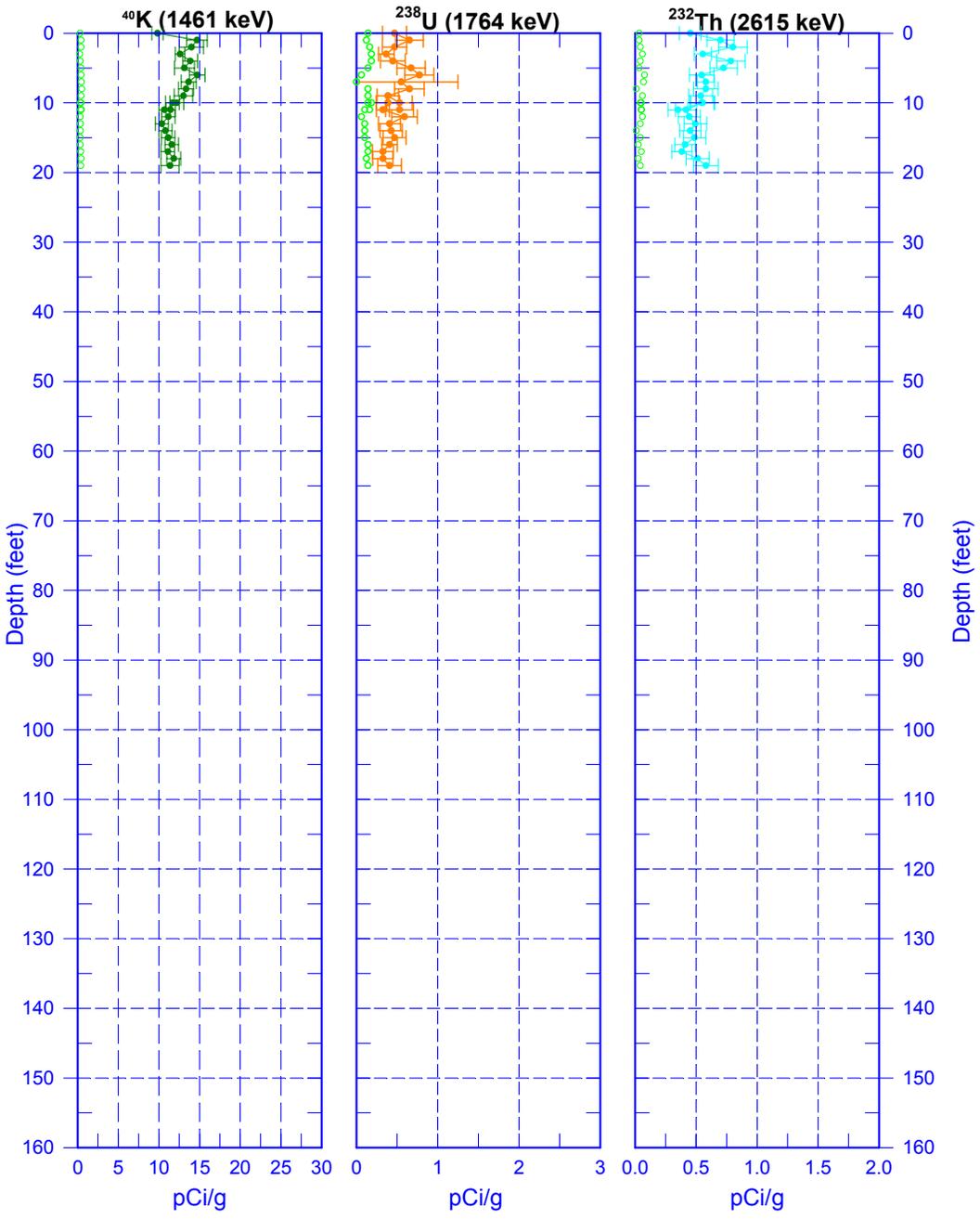
○ MDL

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## Man-made Radionuclide Plot

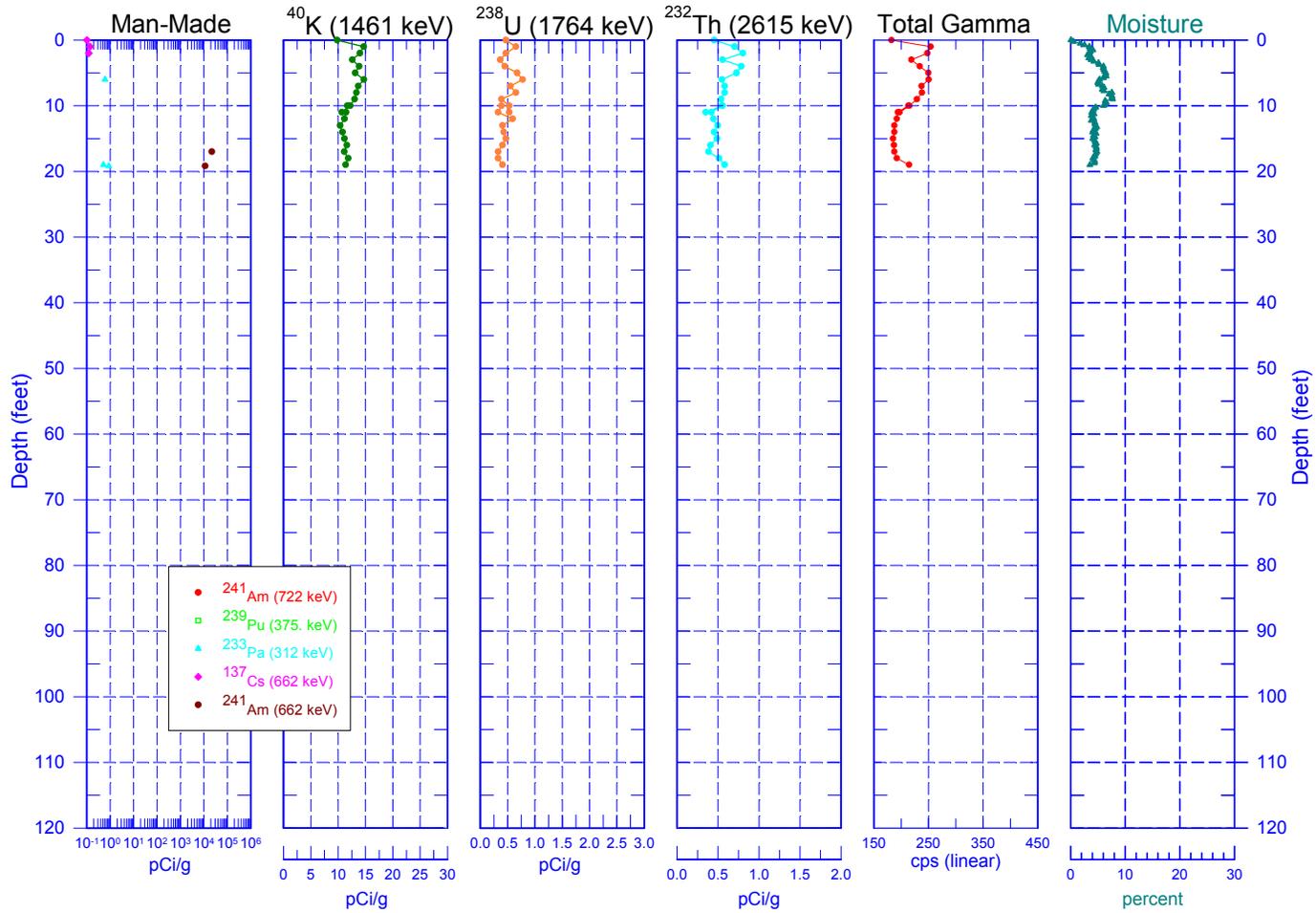


# 299-W18-80 (A7563) Natural Gamma Logs



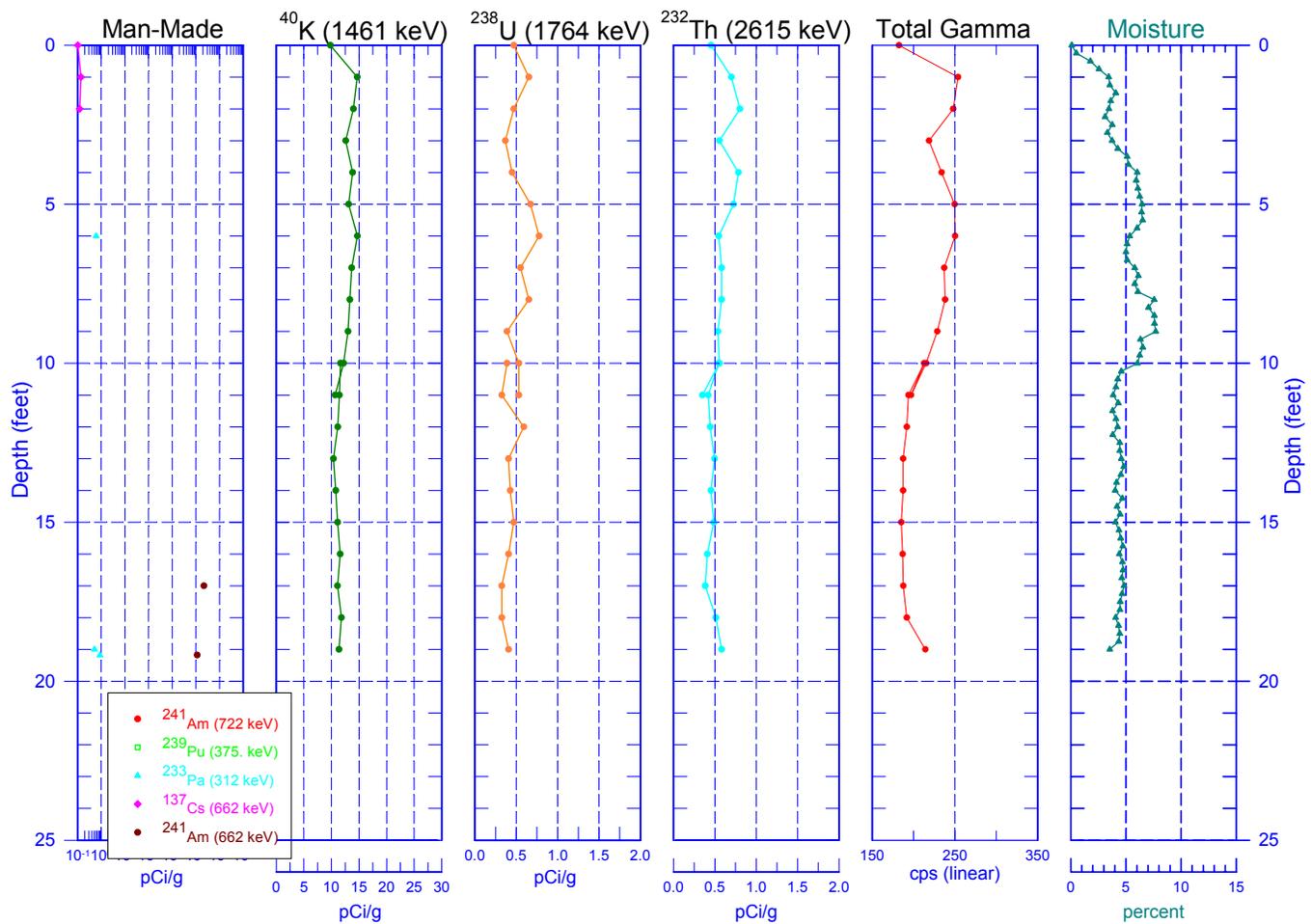
Zero Reference = Top of Casing

# 299-W18-80 (A7563) Combination Plot



Zero Reference = Top of Casing

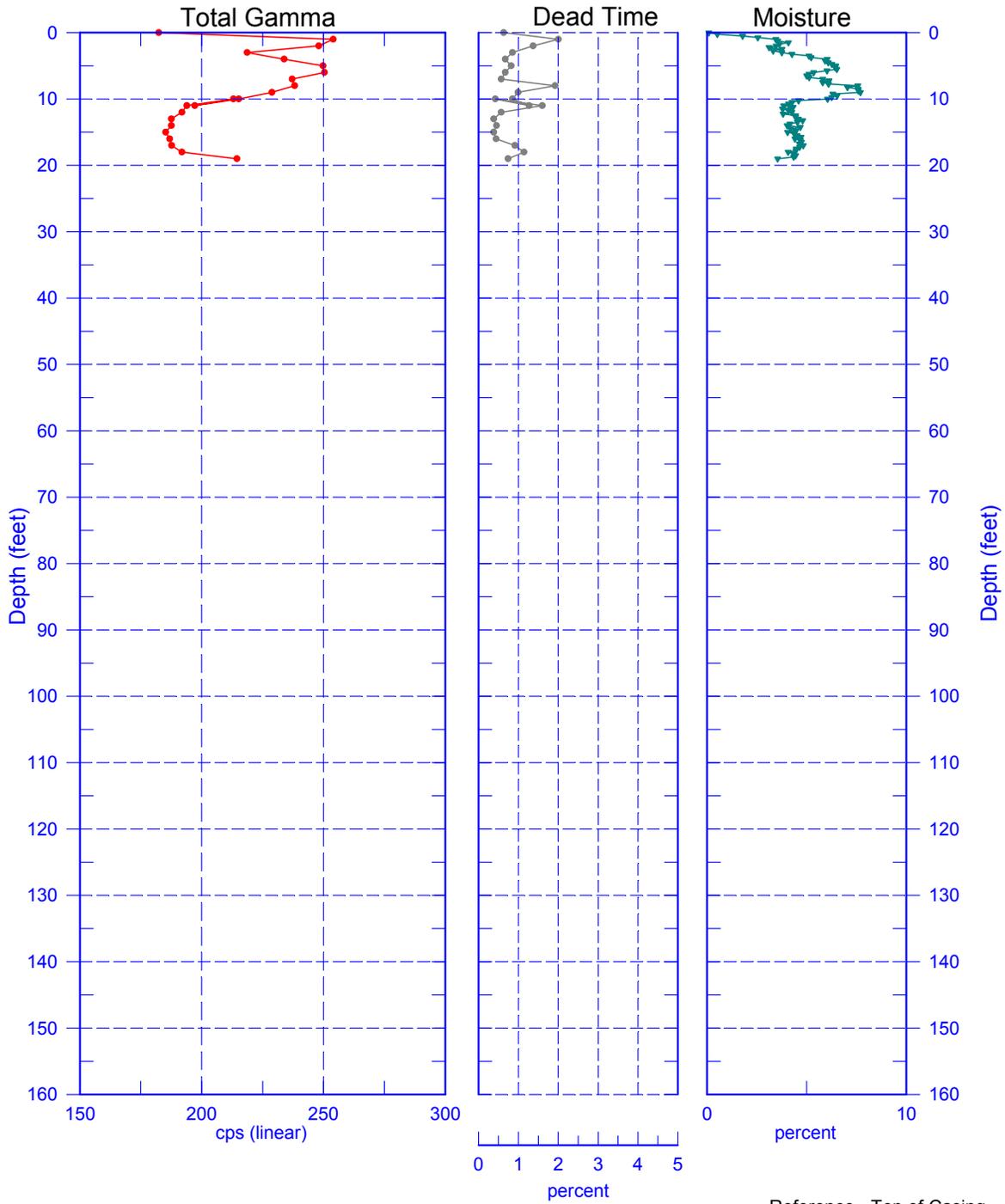
# 299-W18-80 (A7563) Combination Plot



Zero Reference = Top of Casing

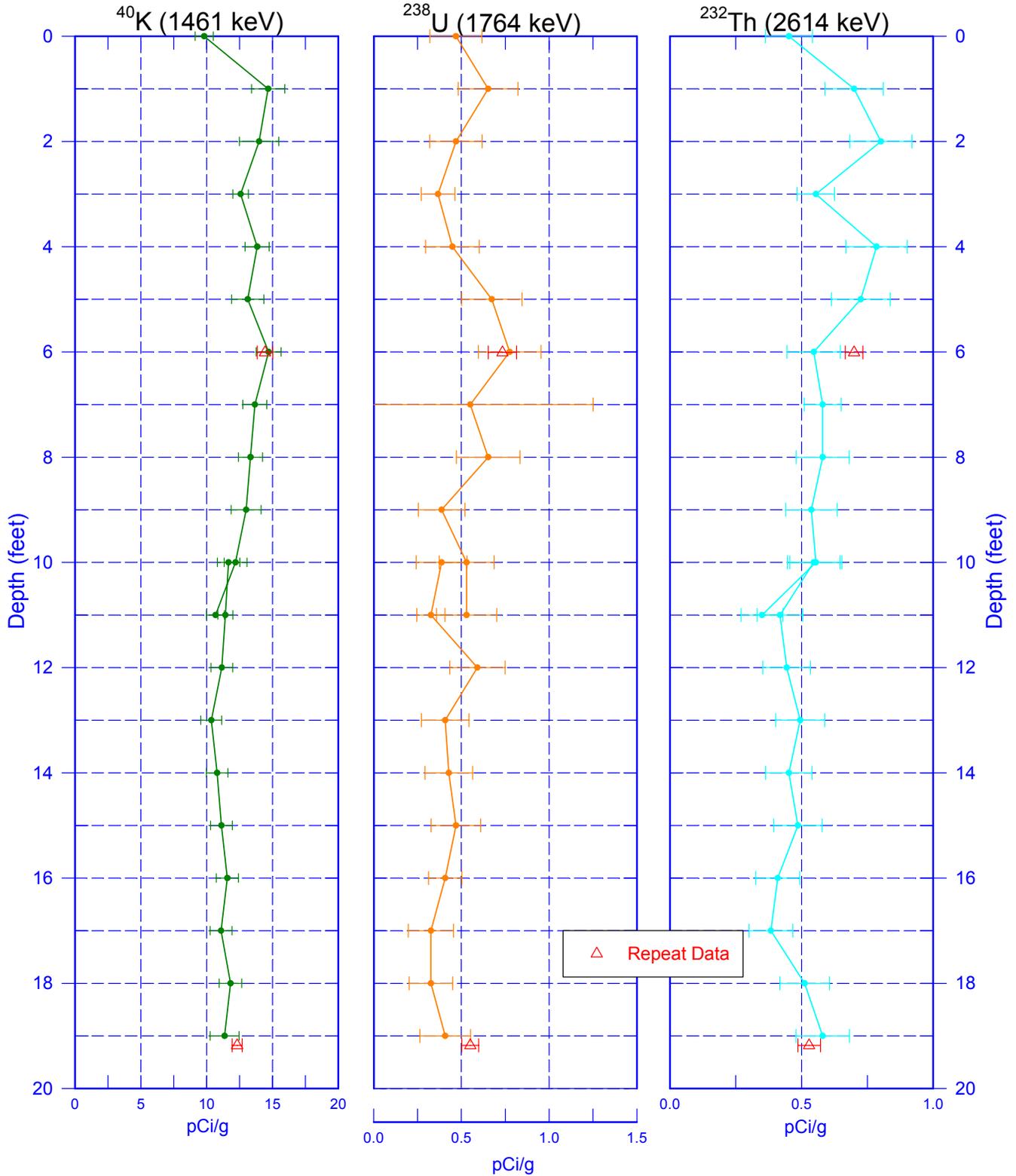
# 299-W18-80 (A7563)

## Total Gamma, Dead Time, & Moisture



# 299-W18-80 (A7563)

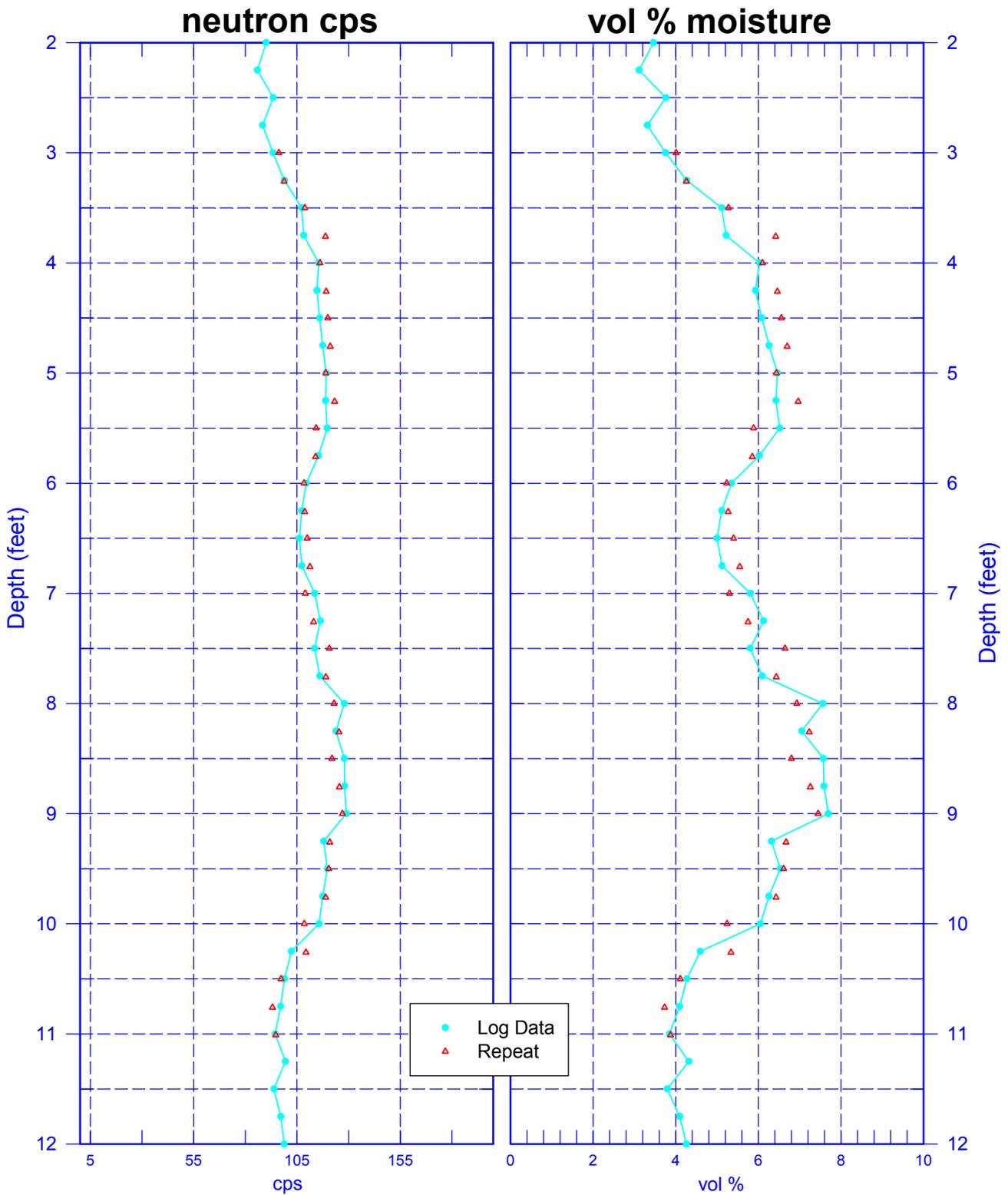
## Repeat Section of Natural Gamma Logs



Zero Reference = Top of Casing

# 299-W18-80 (A7563)

## Repeat Section of Neutron Moisture Log



Zero Reference = Top of Casing